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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,893	03/15/2004	Ming-Hong Hung	DW0087USNA	1499

24199 7590 08/09/2005

DUPONT PERFORMANCE ELASTOMERS L.L.C.  
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WILMINGTON, DE 19805

EXAMINER

WU, IVES J

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/800,893	HUNG ET AL.	
	Examiner	Art Unit	
	Ives Wu	1713	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/30/2004</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

**This office action follows a response filed on July 11, 2005. Applicant has amended the Specification on paragraph beginning on page 6, line 25. Applicant's amendment has been fully considered.**

Claim 2 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Stivers (EP0842980A2) is withdrawn.

**Claims 1-8 remain pending in the application.**

New ground of rejections is introduced as following.

#### *Claim Rejections - 35 USC § 103*

- 1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.**
- Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stivers (EP0842980A2) in view of Farnham et al (US005134211A).

The limitation of parent claim 1 in present invention relates to a curable composition comprising: A) a fluoroelastomer copolymer. B) A fluorinated ether having general formula of  $-\text{[CF}_2\text{CFH-O-Rf-CF}_2\text{CH}_2\text{O]}_n-$  wherein n is such that  $M_w$  is between 2000 and 100,000. wherein Rf is selected either from  $-(\text{CF}_2)_s-$  where s is 1 to 10 or  $-\text{[CF}_2\text{CF}(\text{CF}_3)\text{O]}_t(\text{CF}_2)_u-$  where u is 1 to 10 and t is 1 to 20. C). A curing agent.

As to claim 1, Stivers (EP0842980A2) teaches a fluorocarbon elastomer composition comprising a fluorocarbon elastomer gum, such as a copolymer of vinylidene fluoride and hexafluoropropene, page 3, line 17-18; the resulting composition is further compounded with a crosslinking agent, for example, 2,2-bis-(4-hydroxyphenyl) hexafluoropropane, to obtain curable composition, page 3, line 48-50.

Stivers (EP0842980A2) does not teach a fluorinated polyether having the general formula in the present claim 1.

However, Farnham et al (US005134211A) discloses a polymer consisting essentially of the repeat formula  $-\text{[CF}_2\text{CFH-O-R}^4\text{-CF}_2\text{CH}_2\text{O]}_n-$ , wherein  $R^4$  is

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perfluoroalkylene. In preferred polymers  $R^4$  is  $-(CF_2)_s-$ , wherein  $s$  is 1 to 10, or  $R^4$  is  $-[CF_2CF(CF_3)O]_t(CF)_u-$ , wherein  $u$  is 1 to 10 and  $t$  is 1 to 20, Col. 5, line 25-31.

As to the number  $n$ , Farnham et al (US005134211A) is silent about the range which generates  $M_w$  from 2000 to 100,000, however, Farnham et al disclose  $M_w = 41,00$  in Example 4,  $M_w = 4970$  in Example 6, Col. 8

The advantages of using fluorinated polyether with this general formula:  $-[CF_2CFH-O-Rf-CF_2CH_2O]_n-$  is to improve fluoroelastomer properties at low temperature by decreasing its glass transition temperature such as elasticity and this fluorinated polyether is compatible with most fluoroelastomer such as vinylidene fluoride. Such composition will become a uniform compounded mixture for processing.

It would have been obvious at the time of applicant's invention to replace the fluorinated polyether of Stivers (EP0842980A2) fluorocarbon elastomer composition with the fluorinated polyether of a general formula:  $-[CF_2CFH-O-Rf-CF_2CH_2O]_n-$  taught by Farnham et al in order to achieve the abovementioned advantages.

As to the limitation of  $M_w$  of fluorinated polyether is limited between 15,000 and 45,000 in the dependent claim 2, because the repeating units in the general formula of fluorinated polyether is adjustable, the  $M_w$  of fluorinated polyether is within 15,000 and 45,000 by adjusting repeating units number such as  $s, t, u$  Col. 5, line 25-31;  $M_w = 31,100$  in Example 21, Col. 12 (Farnham et al US005134211A).

As to limitation of dependent claims 3 and 4, Farnham et al (US005134211A) teach in an especially preferred embodiment  $t$  is 1 and  $u$  is 1, or  $s$  is 2, Col. 5, line 31-32.

As to limitation of dependent claim 5, Stivers (EP0842980A2) disclose the fluoroelastomer polymers which may be compounded in accordance with this invention are elastomeric copolymers whose interpolymerized units are derived from two or more of the following fluromonomers: vinylidene fluoride, hexafluoropropylene, chlorotrifluoroethylene, 2-chlorodifluoroethylene, 1,1-chlorofluoroethylene, fluorinated methyl vinyl ether, tetrafluoroethylene, 1-hydropentafluoropropene, dichlorodifluoroethylene, trifluoroethylene, and mixtures thereof, page 5, line 51-55; (also see MPEP 2173.05(h) Markush Group).

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As to dependent claim 6, Stivers (EP0842980A2) discloses Gum D also contains a minor amount of a bromide-containing cure-site monomer, page 7, line 23-24; (also see MPEP 2173.05(h) Markush Group).

As to dependent claim 7, Stivers (EP0842980A2) discloses the most common crosslinking agent for fluorocarbon elastomer gum is a polyhydroxy compound, page 4, line 27; (also see MPEP 2173.05(h) Markush Group).

As to dependent claim 8, Stivers (EP0842980A2) discloses the selection of the acid acceptor can decrease the tendency of the compounded gum to scorch, page, 13, line 56; 3 phr of MgO, preparation 1, page 7, line 50; (also see MPEP 2173.05(h) Markush Group).

### ***Response to Arguments***

3. Applicant's arguments filed on July 11, 2005 have been fully considered but they are not persuasive.

In response to the statements on page 4 of applicant's arguments which cites "It is not disclosed or suggested that Farnham et al's polyethers could be employed in a fluoroelastomer composition as a non-fugitive additive for improving the low temperature sealing properties of the composition".

The motivation of combining the teaching of Stivers (EP0842980A2) with Farnham et al (US005134211A) is well established in last paragraph of page 3 of the first non-final rejection as well as 4<sup>th</sup> paragraph of instant office action. The Examiner cites the compatibility of fluorinated polyether formed by general formula of Farnham et al, Col. 5, line 26 with fluoroelastomer, it is well known scientific principles, more C-H bonds in the fluorinated polyether makes more compatibility with fluoroelastomer because H atom is small to be compatible, it is therefore less fugitive. Moreover, it is well known that certain perfluoropolyether improves the low temperature properties of the vulcanisates, Stivers (EP0842980A2), page 3, line 9-10. The fluorinated polyether disclosed by Stivers is another example of improving the low temperature flexibility to the cured fluoroelastomer composition, page 3, line 35-37. The composition disclosed by

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Stivers is used as O-ring, it is also disclosed by <sup>1</sup>Jing et al (US005681881A) that fluoroelastomer composition containing fluorinated polyether is used as O-ring seals, Col. 1, line 10-11.

Because of the substantially identical general formula of fluorinated polyether disclosed by Farnham et al and by applicant, substantially identical fluoroelastomer disclosed by Stivers and by applicant, with the combination of fluoroelastomer of Stivers and fluorinated polyether characterized in general formula of Farnham et al, it will be useful in same low temperature applications and derive the applicant's invention. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The courts also have held that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references; *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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<sup>1</sup> Jing et al disclose an inventive composition of fluoroelastomer and fluorinated polyether which can be used to form seals, O-rings, gaskets, etc, Col. 10, line 45-46. The fluorinated polyether used are two classes, one class of fluorinated polyether is mixed with fluoropolymer and molded together to form product, the other class of fluorinated ether compound can crosslink with fluoropolymer by crosslinking agent, form product then.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner: Ives Wu

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Date: August 4, 2005